
From: Ralph Wadensweiler [Ralph.Wadensweiler@intusurg.com]
Sent: 11/30/2018 3:12:14 PM
To: Grant Duque [Grant.Duque@intusurg.com]
Subject: FW: ISI Competition Slides

fyi

From: Maximillian Reese
Sent: Friday, November 30, 2018 12:14 PM
To: Ralph Wadensweiler; Anne Narimatsu; Ed Yeh; Lewis Isbell; Chrissy Shuh
Subject: RE: ISI Competition Slides

Hi Ralph,

Very interesting, thanks for sharing the competition summary!

You can get a bit of insight on what Verb is doing by quickly going through their job listings. Here are some things that come up frequently:

- "Build models which can describe scenes, actions and decisions critical to the surgical procedure."
- "There comes a time in a commercial endeavor when you have to draw a line in order to get "Gen 1" to the market."
- "Work closely with Hardware Engineering and external partners to provide feedback on the design by evaluating the robotic instruments."
- "5+ years of proven record of SW development in one of the following areas: Robotics, Controls and Motion Planning, VR/AR, Physics Simulations, SLAM, Mapping and Localization or Sensor Fusion."
- "Blending robotics, imaging systems, user interface / user experience requires a talented team of engineers with strong system integration experience."

From these it's pretty apparent they're doing something with VR/AR display system that has some kind of integrated machine learning to provide real-time data/advice to a surgeon. Also motion planning, SLAM, localization, mapping, and sensor fusion are all topics that are typically associated with autonomous robotics systems (like autonomous cars) so that would imply that they are developing non-teleoperated use modes. The mention of a "Gen 1" product implies that they have moved out of R&D and into a NPD/NPI phase for releasing a system. And finally the last bullet sounds like an overall description of their product which includes a lot of focus on user interface and experience so I wouldn't put it past them to release a phone app or something gimmicky as well.

Oh and just looking at who they're hiring, it's basically all software and controls people so I'm guessing Ethicon is the complete owner for all instrument hardware development. The last quote is pulled from Ethicon's job listings:

- "Contribute to architecting and implementing Ethicon's vision for smart/connected operating rooms, including digital/robotic surgery, advanced surgical instruments employing smart/adaptive algorithms to improve patient outcomes, and a connected IoT infrastructure for data analytics and machine learning."

-Max

From: Ralph Wadensweiler
Sent: Friday, November 30, 2018 11:14 AM
To: Anne Narimatsu; Ed Yeh; Lewis Isbell; Maximillian Reese; Chrissy Shuh
Subject: ISI Competition Slides

Team,

If you have 18 minutes to spare, this presentation from Riccardo Autorino (Urologist) is very interesting. Grant provided a link in his weekly meeting a few weeks back but here is the link again:

<https://grandroundsinurology.com/robotic-surgical-systems-in-urology/>

In the slide presentation video, he discusses robotic surgical systems for Urological procedures. The section on the competition is interesting:

- Surgeons don't like the ISI monopoly
- Interesting MCS tip cover on a competitor MCS (may be similar to something Ed is considering)
- Amazingly similar systems and even instruments (a bipolar instrument looked like our older Ultem covered bipolar instruments)
- I didn't see anything too threatening yet but he didn't have information on Verb's system.

-Ralph